ENHANCED LOCOMOTIVE ADHESION CONTROL
Attorney - J. Joseph Muller (314) 872-8118

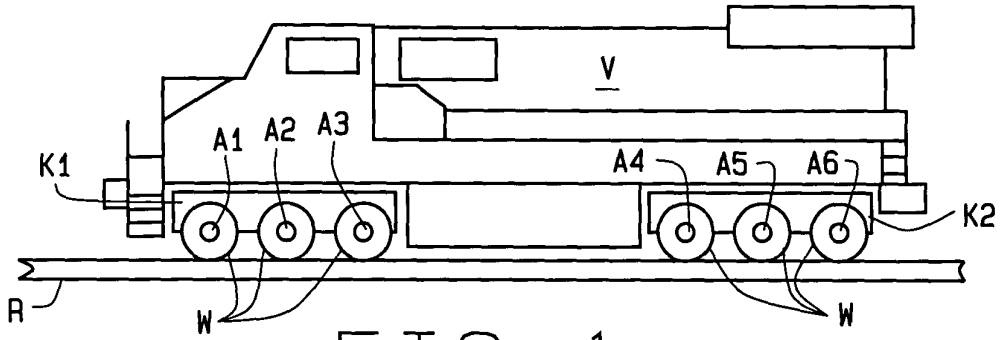

FIG. 1

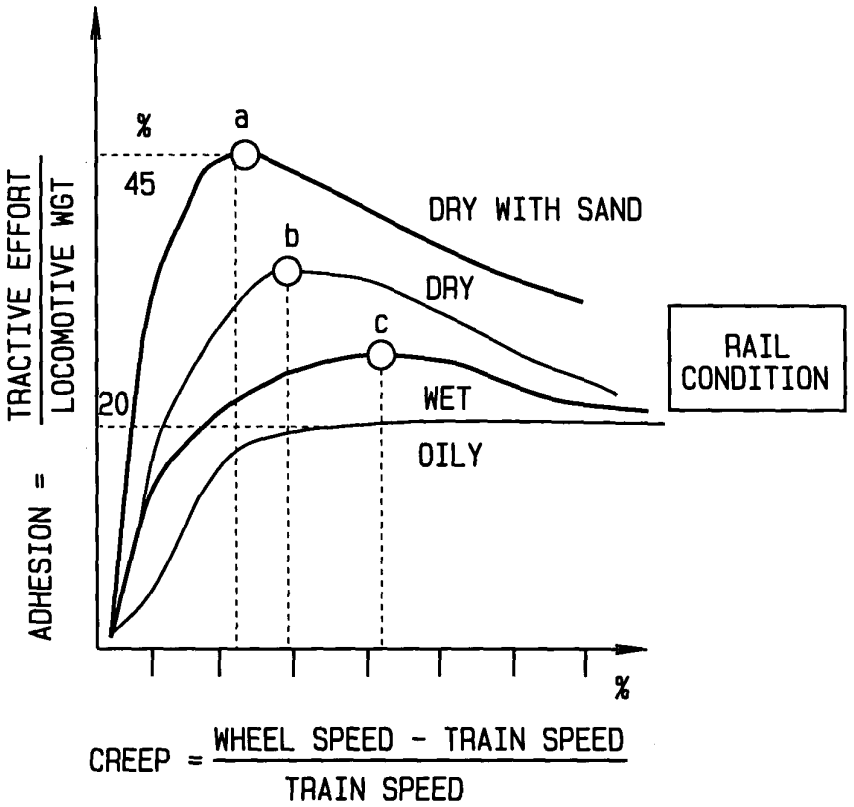

FIG. 2

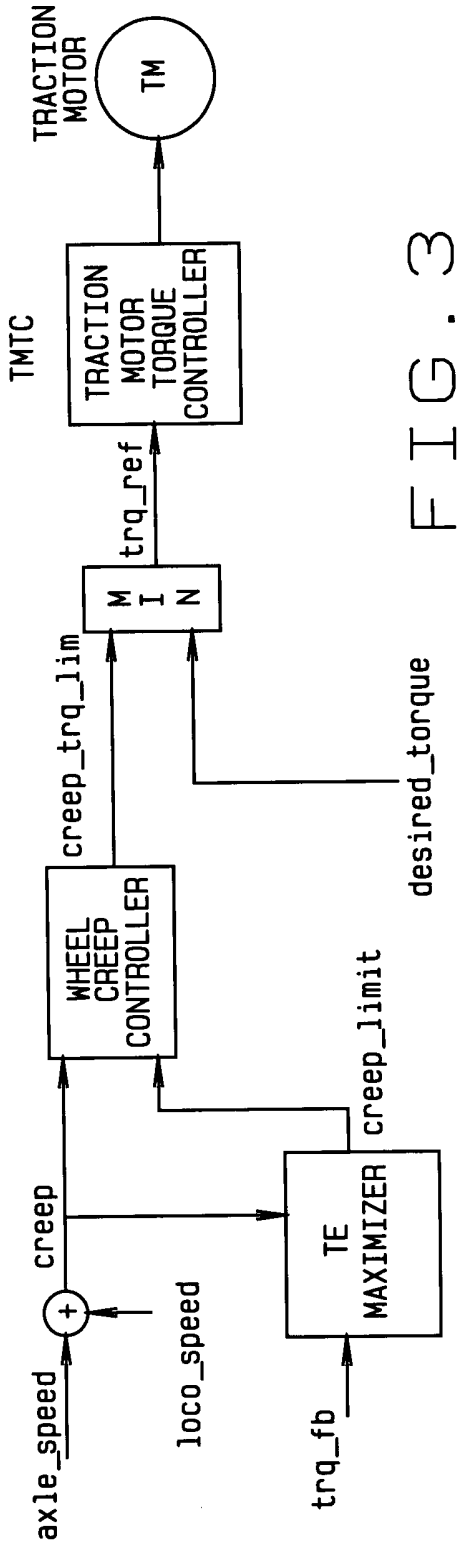

FIG. 3
PRIOR ART

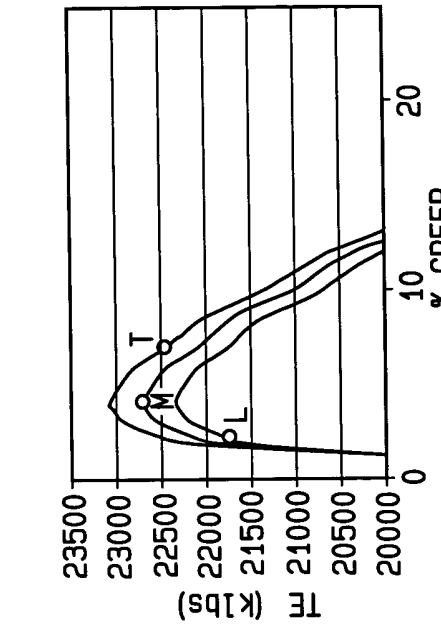

FIG. 5

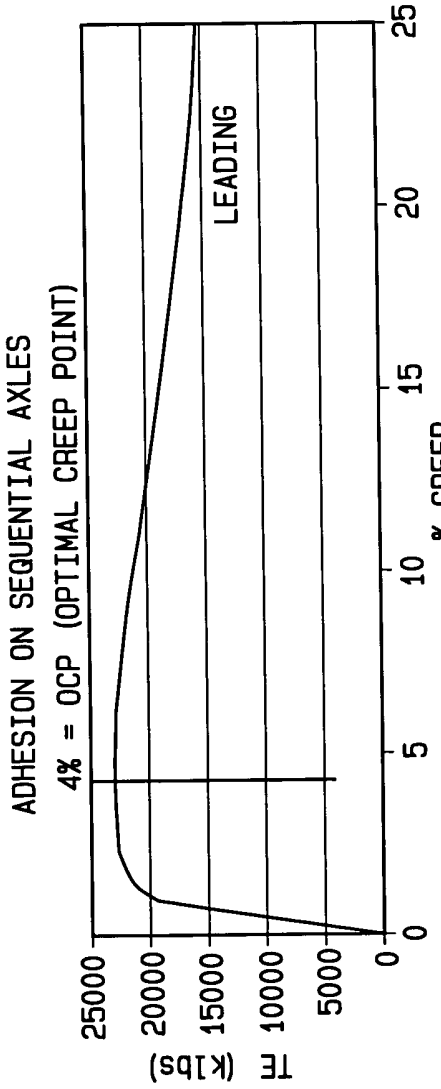

FIG. 4

	TE_M> TE_L	TE_T> TE_L	TE_L> TE_M	TE_T> TE_M	TE_L> TE_T	TE_M> TE_T
MOVE LEAD CREEP TOWARD MIDDLE	Y					
MOVE LEAD CREEP TOWARD TRAIL		Y				
MOVE MIDDLE CREEP TOWARD LEAD			Y			
MOVE MIDDLE CREEP TOWARD TRAIL				Y		
MOVE TRAIL CREEP TOWARD LEAD					Y	
MOVE TRAIL DREEP TOWARD MIDDLE						Y

FIG. 6

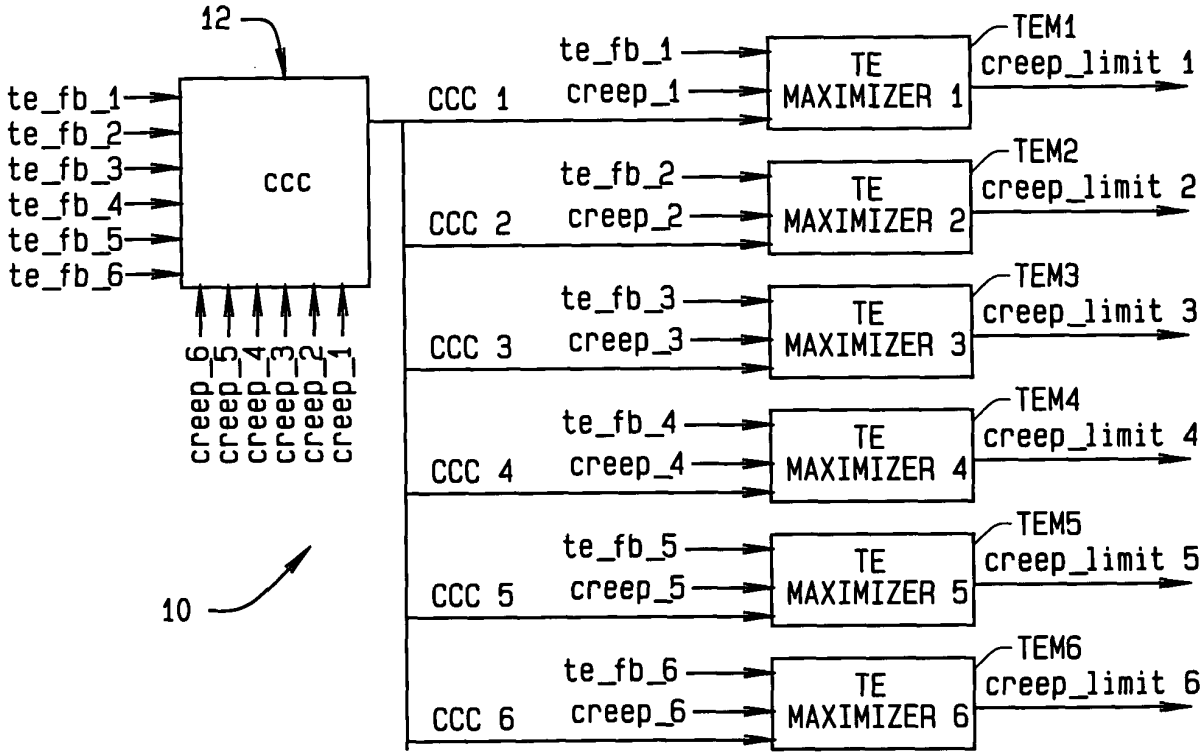

FIG. 7

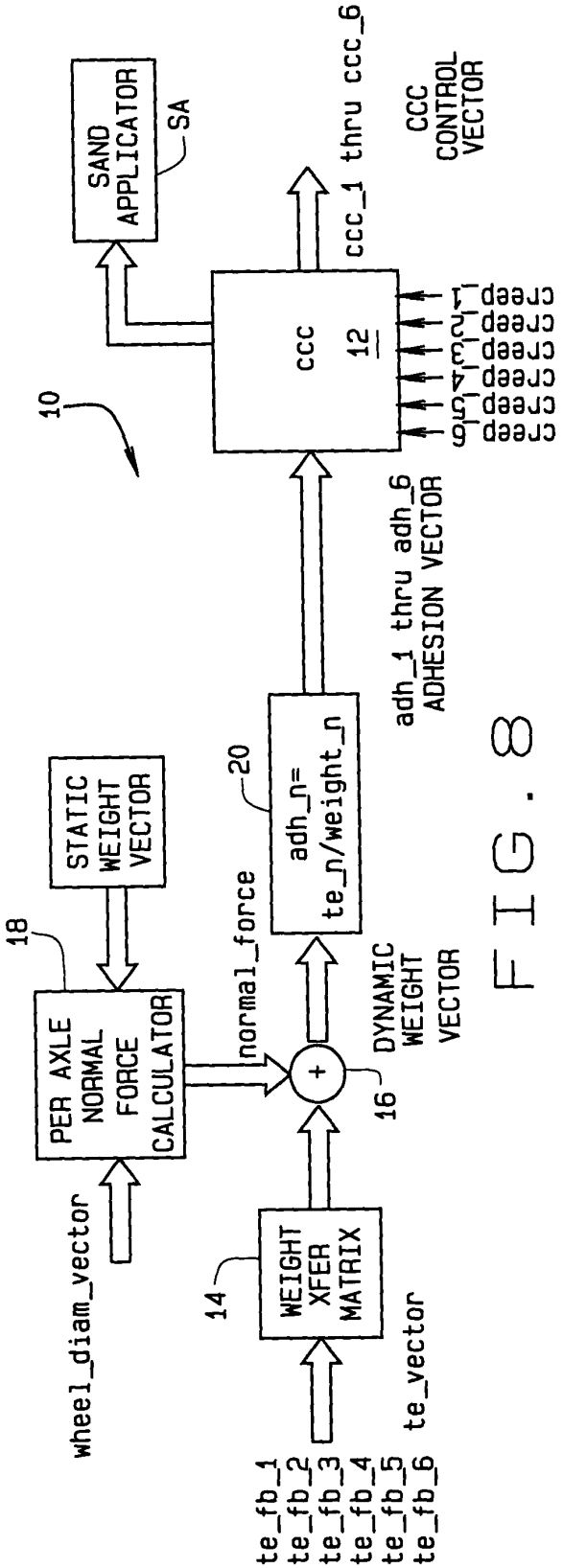

FIG. 8

	Adh_M> Adh_L	Adh_T> Adh_L	Adh_L> Adh_M	Adh_T> Adh_M	Adh_L> Adh_T	Adh_M> Adh_T
MOVE LEAD CREEP TOWARD MIDDLE	Y					
MOVE LEAD CREEP TOWARD TRAIL		Y				
MOVE MIDDLE CREEP TOWARD LEAD			Y			
MOVE MIDDLE CREEP TOWARD TRAIL				Y		
MOVE TRAIL CREEP TOWARD LEAD					Y	
MOVE TRAIL DREEP TOWARD MIDDLE						Y

FIG. 9

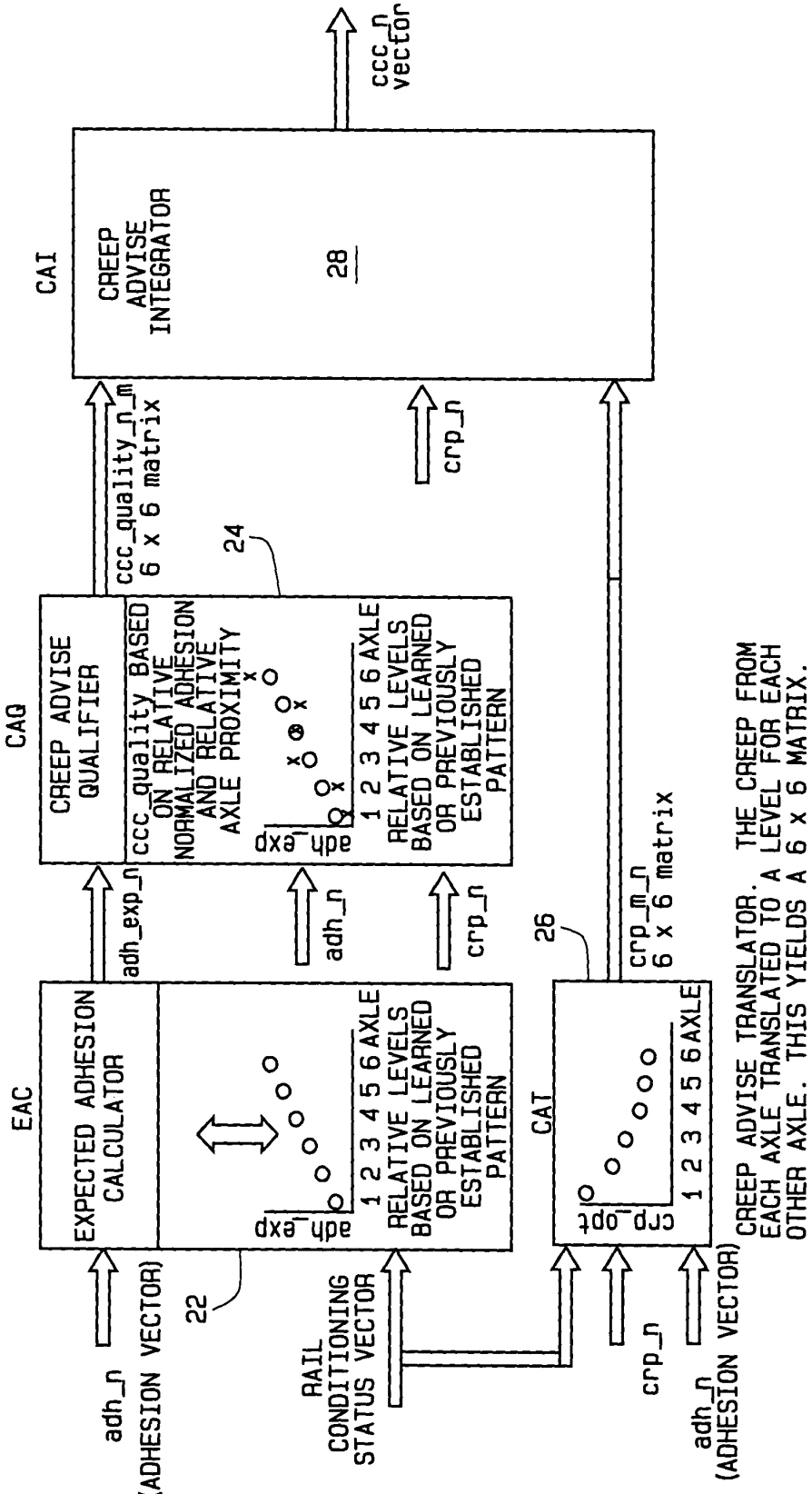
EAC
EXPECTED ADHESION CALCULATOR
adh_n
(ADHESION VECTOR)
22
adh_exp
1 2 3 4 5 6 AXLE
RELATIVE LEVELS BASED ON LEARNED OR PREVIOUSLY ESTABLISHED PATTERN
RAIL CONDITIONING STATUS VECTOR
adh_exp_n
CAQ
CREEP ADVISE QUALIFIER
ccc_quality BASED ON RELATIVE NORMALIZED ADHESION AND RELATIVE AXLE PROXIMITY
24
adh_n
crp_n
ccc_quality_n_m
6 x 6 matrix
CAI
CREEP ADVISE INTEGRATOR
28
ccc_n vector
crp_n
CAT
26
crp_opt
1 2 3 4 5 6 AXLE
crp_m_n
6 x 6 matrix
crp_n
adh_n
(ADHESION VECTOR)
CREEP ADVISE TRANSLATOR. THE CREEP FROM EACH AXLE TRANSLATED TO A LEVEL FOR EACH OTHER AXLE. THIS YIELDS A 6 x 6 MATRIX.

FIG. 12

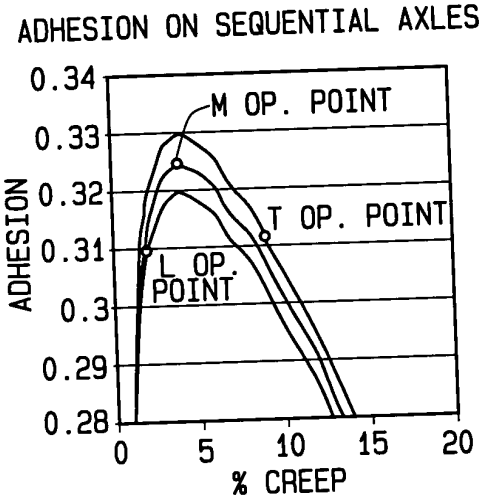

FIG. 10

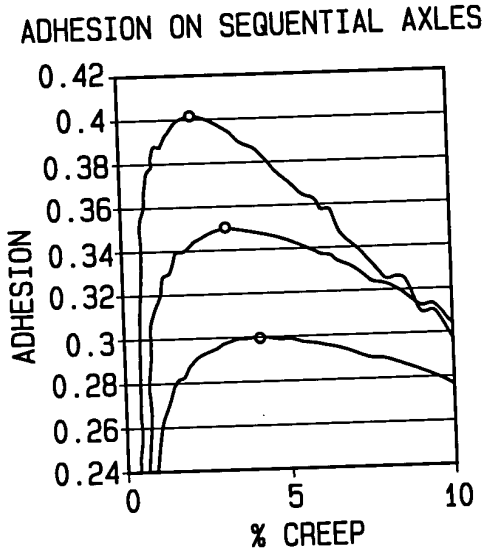

FIG. 11

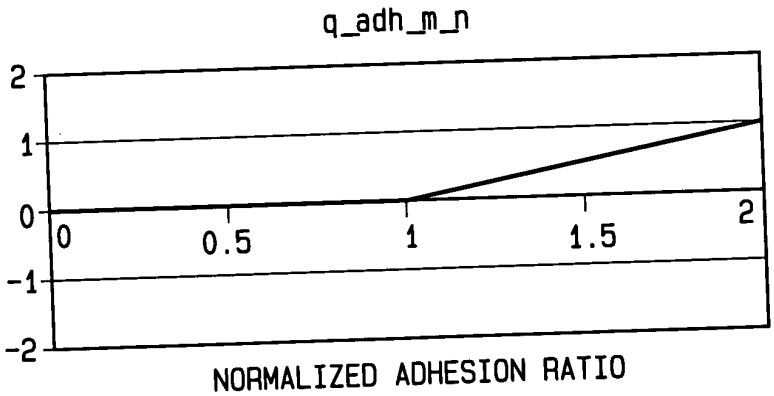

FIG. 13

	qprox_m_n_matrix					
	ADVISE FROM AXLE					
ADVISE TO AXLE	1	2	3	4	5	6
1	0.00	1.00	0.50	0.33	0.25	0.20
2	1.00	0.00	1.00	0.50	0.33	0.25
3	0.50	1.00	0.00	1.00	0.50	0.33
4	0.33	0.50	1.00	0.00	1.00	0.50
5	0.25	0.33	0.50	1.00	0.00	1.00
6	0.20	0.25	0.33	0.50	1.00	0.00

FIG. 14

AXLE	weight	adh	adh_exp
1	67000	0.225	0.2125
2	68000	0.216	0.2295
3	69000	0.2755	0.2465
4	70000	0.2635	0.2635
5	71000	0.231	0.2805
6	72000	0.322	0.2975

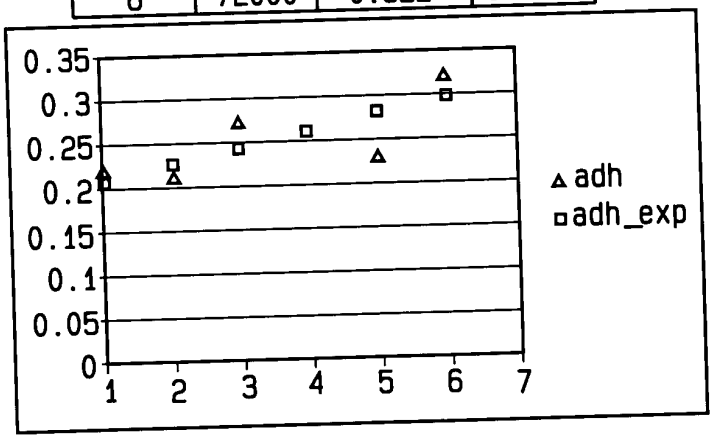

FIG. 15

	q_adh_m_n matrix					
	ADVISE FROM AXLE					
ADVISE TO AXLE	1	2	3	4	5	6
1	0.00	0.00	0.06	0.00	0.00	0.02
2	0.13	0.00	0.19	0.06	0.00	0.15
3	0.00	0.00	0.00	0.00	0.00	0.00
4	0.06	0.00	0.12	0.00	0.00	0.08
5	0.29	0.14	0.36	0.21	0.00	0.31
6	0.00	0.00	0.03	0.00	0.00	0.00

FIG. 16

	ccc_quality_m_n matrix					
	ADVISE FROM AXLE					
ADVISE TO AXLE	1	2	3	4	5	6
1	0.00	0.00	0.03	0.00	0.00	0.00
2	0.13	0.00	0.19	0.03	0.00	0.04
3	0.00	0.00	0.00	0.00	0.00	0.00
4	0.02	0.00	0.12	0.00	0.00	0.04
5	0.07	0.05	0.18	0.21	0.00	0.31
6	0.00	0.00	0.01	0.00	0.00	0.00

FIG. 17

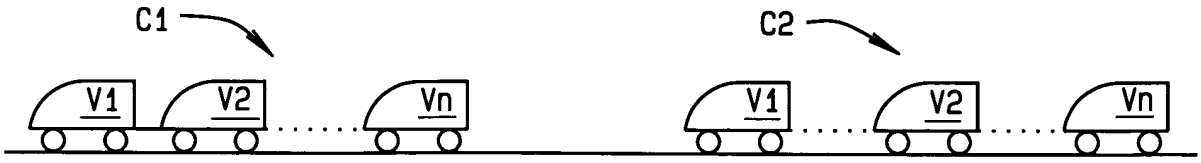

FIG. 20

INVENTOR: Ajith K. Kumar, et al.
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ENHANCED LOCOMOTIVE ADHESION CONTROL

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AXLE	crp	crp_exp
1	0.15	0.2
2	0.2	0.13
3	0.0735	0.0845
4	0.05145	0.054925
5	0.16	0.035701
6	0.025211	0.023206

	crp_m_n matrix					
	CREEP FROM AXLE					
TRANSLATED TO AXLE	1	2	3	4	5	6
1	0.15	0.31	0.17	0.19	0.90	0.22
2	0.10	0.20	0.11	0.12	0.58	0.14
3	0.06	0.13	0.07	0.08	0.38	0.09
4	0.04	0.08	0.05	0.05	0.25	0.06
5	0.03	0.05	0.03	0.03	0.16	0.04
6	0.02	0.04	0.02	0.02	0.10	0.03

FIG. 18

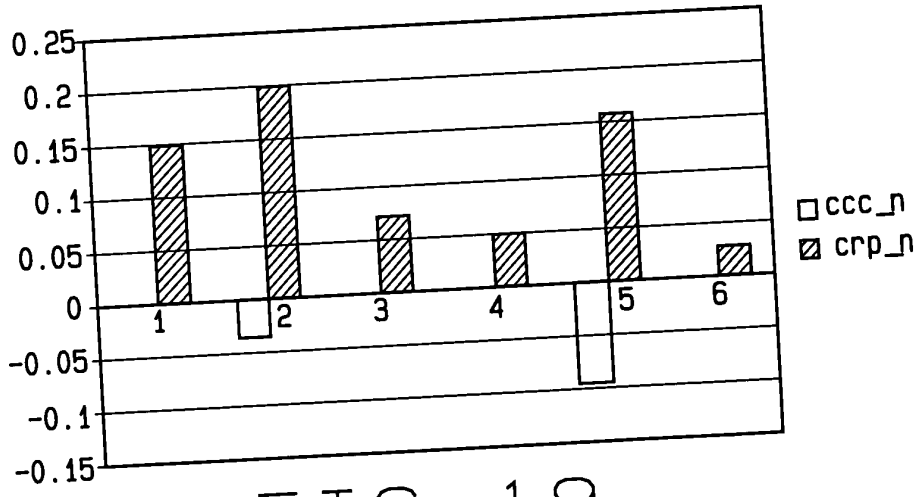

FIG. 19